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# NORTH AMERICAN REVIEW.

No. CCXIX.

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APRIL, 1868.

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ART. I. — *Annual Report of the Metropolitan Board of Health of New York.* 1866. New York. 1867. 8vo. pp. 456.

It has been said that “the saddest pages in the history of all nations are those which treat of the wholesale sacrifice of human life, through ignorance or neglect of the simplest means of preserving health or averting disease.” It is now known that the fearful epidemics, or plagues, so called, that swept with such deadly malignity through the cities of the Middle Ages, had their origin and derived their strength from gross neglect of the simplest sanitary laws. Narrow and filthy streets, crowded, ill-ventilated, and dark dwellings, lack of provision for drainage, and of facilities for personal and general cleanliness, — these were the causes of pestilence no less in mediæval Europe than at the present day. It needs but a glance to see how the frequency and virulence of epidemics have decreased with the application of improved sewerage, the introduction of plentiful supplies of water, the destruction or remodelling of crowded and filthy quarters, and the removal from populous districts of such processes and manufactures as contaminate the atmosphere, and so reduce the vigor and degrade the *morale* of the inhabitants.

It was a consideration of these facts, together with the daily increasing evidence that the city of New York, or at least a large portion of it, was already in a condition, not only to foster such ordinary forms of disease as depend upon foul air and

general uncleanness, but to invite and rapidly develop contagion and pestilence, that some six years since stimulated the legislative action which resulted in the establishment of the Metropolitan Board of Health.

Many portions of New York and Brooklyn, but especially of New York, had become densely populated, not only, in fact not chiefly, with native citizens, but with immigrants from abroad. Every week added largely to this population. The older portions of the city, where the laboring classes congregated, were becoming overcrowded to a degree that rendered cleanliness and decency almost impossible.

Diseases of every kind, but especially such as have their origin directly or indirectly in the lack of pure air, personal cleanliness, and nutritious food, prevailed constantly and to an alarming extent among the inhabitants of these districts. The mortality was very great, particularly among children; and it was from time to time startlingly evident that the almost utter neglect of sanitary regulation was leaving the city a victim to the poisonous influence of these sources of sickness, which were daily extending their limits, and every year more imminently threatening to destroy the salubrity of a city to which Nature had afforded special facilities for the preservation of life and health.

The engrossing interests of commerce and politics seemed to have blinded the public generally to the shadow that was gradually, but steadily, growing wider and deeper.

Some years since, however, several prominent members of the Academy of Medicine, and subsequently the "Citizens' Association," an organization composed of the more intelligent and public-spirited men in the community, inaugurated a systematic and persistent effort at sanitary reform, and the Legislature of the State was urgently appealed to for aid.

Each year, however, the effort proved unsuccessful, until at last, in the winter of 1865-66, when already from the Old World had come the silent, but fearful, warning of the approach of cholera, the importance of a reform was appreciated.

On the 26th of February, 1866, a Health Law was passed by the Legislature. This law was entitled "An Act to create a Metropolitan Sanitary District, and Board of Health therein,

for the 'Preservation of Life and Health, and to prevent the Spread of Disease.'

This law created a Metropolitan Sanitary District, comprising the cities of New York and Brooklyn and several adjoining counties, which was to be under the control, in all matters bearing upon the public health, of a Board of Health, to be composed of four health commissioners, three of whom should be medical men, the fourth a layman, the commissioners of police, four in number, *ex officio*, and the health officer of the port, *ex officio*,—also the officer, a medical man, who had charge of the quarantine. It provided likewise for the appointment of a sanitary superintendent, an assistant superintendent, sanitary inspectors, clerks, employees, &c.

The Board organized its corps of officers and employees without delay, and commenced at once upon its labors. A plan was perfected by which the district should be under constant and rigid inspection, and the Board notified of the result.

The cities of New York and Brooklyn were divided into districts of limited extent, and a sanitary inspector was assigned to each district. The inspectors thus assigned were instructed to proceed forthwith to "familiarize" themselves with the sanitary condition of their respective districts; to transmit to the superintendent, semi-weekly, written reports on such nuisances found in their districts as in their opinion demanded special and immediate attention, giving the situation and number of the premises, the owner's name, and a brief, but distinct, description of the nuisance itself; to designate such streets or parts of streets as were particularly neglected and filthy; to pay especial attention to tenement-houses; to diligently search therein for local causes of disease, particularly from overcrowding, and the lack of proper ventilation, drainage, and light, and, if possible, to indicate in their reports the remedy for such deficiencies, when found. Whenever individual cases of sickness were met with, which in the opinion of the inspectors should, either for the good of the patient or that of his neighbors, be removed to the hospital, they were directed to effect such removal, if possible, by advice and assistance given to the friends of the patient,

and failing in this, to report the circumstances at once to the superintendent.

By order of the Board, a book was placed in each precinct station-house in the city, in which citizens were invited to enter complaints of nuisances, and a central "Complaint Office" was established in connection with that of the superintendent, where complaints could be made, either in person or by letter, and to which the various complaints entered at the precinct station-houses were forwarded daily. Here all complaints were supervised, assorted, and thence referred to the inspecting officers of the districts in which the nuisances complained of were said to exist. Their reports were carefully examined in the office of the superintendent, with the advice, when necessary, of the attorney of the Board. Such as were found to be properly prepared were at once forwarded to the Board for its action, while those which were found defective in any particular were returned to their respective authors for correction. Some slight modifications in the method of proceeding have from time to time been adopted. In many cases it has been necessary only to call the attention of the property-owners to the evil to have it remedied, and it is customary for the superintendent to send a warning notice to the party responsible. After the lapse of a reasonable time from the date of such notice, a reinspection is made, and if it be found that the nuisance has been abated, no further action is taken in the matter; if otherwise, the original report is laid before the Board to become the basis of an order, the service of this to be followed by a second reinspection, and, provided the nuisance remain still unabated, by the execution of the order under the direction of the sanitary superintendent. Under this system a large number of nuisances are promptly removed by the owners of property, who not unfrequently express their gratification at being notified, while in other instances the more tedious process of forcible execution becomes necessary.

The field of jurisdiction of the Board was very extensive, and presented subjects of reform exceedingly diversified in character and apparently unlimited in number, a large proportion of which demanded, with almost equal urgency, immediate

and decisive action. Naturally the cities of New York and Brooklyn exhibited the most pressing demands. Not only were large tracts covered with densely crowded, ill-ventilated, and filthy tenement-houses, but, scattered everywhere, were individual nuisances of the most aggravated character, contributing their noxious exhalations to the deteriorated atmosphere.

In New York alone there are eighteen thousand five hundred and eighty-two tenement-houses, that is, houses occupied by several families, living independently of each other, but having a common right in the halls, stairways, yards, cellars, and sinks. Of this number, when first examined by the inspectors, fifty-two per cent were found in bad sanitary condition, that is, in a condition detrimental to the health and dangerous to the lives of the occupants, sources of infection to the neighborhood, and of insalubrity to the city at large. Thirty-two per cent were in this condition purely from overcrowding, accumulations of filth, want of water supply, and other results of neglect. The danger to the public health from this state of things, especially in the event of an epidemic, is not, however, adequately expressed by these figures; for while in the upper and newer parts of the city the tenement-houses are comparatively well built and properly looked after, there are many localities where almost entire blocks are composed of such houses, all of which were found to be in bad condition, and where the danger was greatly increased by this grouping.

The causes of the improper sanitary condition of tenement-houses may be classed under two heads, namely: first, those due to faults in the original construction of the buildings; and second, those due to overcrowding and neglect.

Prominent under the first head is, — First, *the custom of erecting a front and rear tenement-house on a single lot.* By this plan the rear end of each rear house is within a short distance, varying in different instances from six inches to two feet, of the rear end of the rear house situated upon the reverse lot fronting on the next street, above or below as the case may be. The result of this is, that the back rooms of the rear houses are entirely cut off from direct sunlight, and the ventilation is

necessarily very imperfect. The spaces, too, between houses thus contiguous are always damp, and very frequently, from being made receptacles for garbage and other offensive matters, give off the foulest exhalations, which are either diffused through the houses, or compel the tenants to keep the rear windows constantly closed, and thus preclude the slender means of ventilation which they might otherwise afford. Even the front rooms of such houses suffer in a similar manner, though not to so great a degree,—the presence of the high front house, separated only by a narrow court, allowing but a meagre share of direct light and fresh air.

Second, *deficient ventilation* is a very common evil in tenement-houses. The halls are close, rarely, except on the lower floor, extending to either front or rear wall, so as to admit of a window. Therefore, as the tenants keep their room-doors closed, the hall is entirely cut off from the external air, save by the chance opening of the street entrance. The dwelling-rooms have no provision for ventilation, except such as may be afforded by the windows, which are usually on but one side of the room. The sleeping-apartments open from these dwelling-rooms, and are simple closets, with absolutely no ventilation.

Third, *absence of light*. For the same reasons that the halls are unventilated, they are also dark and damp. No sunlight can enter them. The space allowed for the hall is so narrow that a proper well is impossible, and no adequate skylight is provided. A large proportion of these halls are so dark that at midday it is difficult to discern objects in them without opening some adjacent room-door. In many instances the floors are damp and rotten, and the walls and banisters sticky with a constant moisture.

Fourth, *basements, or cellars*. The basements, or cellars, are often entirely under ground, the ceiling being a foot or two below the level of the street, and are necessarily far more damp, dark, and ill-ventilated than the rest of the house. Many of these are constantly occupied, and not infrequently used as lodging-rooms, having no communication with the external air save by the entrance, and the occupants being entirely dependent upon artificial light by day as well as by

night. In the lower streets of the city they are often subject to regular periodical flooding by tide-water, to the depth of from six to twelve inches, frequently so as to keep the children in bed until ebb-tide.

Fifth, *deficient drainage*. A large number of tenements have no connection with the common sewer, and no provision for drainage but surface gutters, by which all the house slops are conducted across or immediately beneath the sidewalk into the street gutter, where, from lack of the proper grade, they remain stagnant and putrefying during the summer, and during the winter freeze and turn the flow into the cellars. Indeed, at all seasons, much of the fluid matter deposited by the tenants in the yards makes its way into the cellars, and it is by no means exceptional to find entire blocks of houses where the cellars are constantly flooded to a greater or lesser extent from this cause. In other instances, the flow from the different sinks and wash-basins on the successive floors is conducted by pipes, devoid of traps, to a common wooden drain of inadequate dimensions, running immediately beneath the basement floors of contiguous houses, and thence passing into the street sewer. The current through these drains is generally sluggish, frequently obstructed by accumulations of solid matter or by the decay and consequent breaking down of the drain itself. In the event of such accidents, collections of stagnant and offensive fluids take place beneath the basement floor, or in the cellar, if there be one; the whole house becomes permeated with a disagreeable stench, the cause of which is not discovered until sickness or intolerance of the odor leads to complaint and investigation. These drains are not infrequently furnished with ventilators, consisting of flues immediately connected with the interior of the drain, and thence passing up through the house, with openings in the various apartments, through which the gases resulting from the decomposition below are diffused. The lack of proper traps gives rise to the same difficulty,—the exhalations from the stagnant contents of the drain finding their way up through the waste-pipes into the halls and rooms.

Such, with the occasional absence of Croton water, and the frequent lack of fire-escapes, are the most prominent faults of construction in New York tenement-houses.



Evils of the second class, arising from overcrowding and neglect, are, accumulations of garbage and filth of every description in the yards and cellars ; filthy halls, stairways, and rooms, leaky roofs, and broken windows. All these aggravate the results of faults of construction, and render these dwellings unfit for habitation.

To the filthy habits of the occupants, and especially to the indifference of the owners, are due in great measure the origin and continuance of these terrible sources of disease. Some of these tenements are owned by persons of the highest social position, but who fail to appreciate the responsibility which rests upon them. They are frequently entirely ignorant of the condition of their property ; and either trust its care to an agent, who of course feels still less responsibility, and whose duty it is in the main so to manage the property as to make it productive of the greatest pecuniary advantage to his employer, or they lease it to "middle men," as they are called, who have no interest in it except its immediate profits, and who destroy even its original ventilation, and aggravate its defects, by dividing the rooms into smaller ones, and crowding three or four families into space hardly sufficient for one.

The latter is not unfrequently the case with houses not originally intended for tenement-houses, but which are abandoned private residences, arranged for the accommodation simply of one family. The "middle men" hire these old houses for a term of years from the owner, who is glad to get rid of them until he is ready to tear them down and improve the property, while meantime it is not for his interest nor that of the lessee to make improvements or repairs.

Disease, especially in the form of fevers of a typhoid character, was constantly present in these dwellings, and every now and then became epidemic in one or more of them. In one it was found that twenty cases of typhus had occurred during the preceding year. In the summer of 1866, tenement-houses were the first resting-place and the permanent abode of cholera.

The effort to ameliorate or remedy these evils has been by far the most difficult labor of the Board ; the more so because of their strong tendency to recur, and, unless watched with

unceasing vigilance, to become as rife and malignant as ever. But the landlords and owners of tenement-houses have been roused to co-operation with the Board, and already a great change has been effected in the condition of such dwellings.

The custom of erecting a front and rear tenement-house on a single lot should be discontinued. The front houses might then be made deeper, and yet leave sufficient space between them and abutting houses from the next street to allow of proper provision for ventilation and light.

To improve the ventilation and light of existing tenement-houses, several plans are feasible which involve comparatively moderate expense. To ventilate and light the halls, the hall bedrooms at one end on each floor may be dispensed with, thus giving the halls the benefit of the windows. Into the halls thus improved a moderate-sized window, three feet square, should be cut from the dark bedrooms which have no opening save the door from the dwelling-rooms. In most of the New York tenement-houses these windows have now been introduced, and are of great value.

We desire to invite especial attention to a plan suggested by the engineer of the Board of Health, which is not only admirably adapted to purposes of ventilation and light, but at the same time secures the safety of tenants in case of fire. This plan is, to do away altogether with the present stairway, and substitute one in a tower separate from and in the rear of the houses, and connected with them by a bridge at each story, protected by a suitable railing or sheathing. The space now occupied by the stairway is to be left vacant, and a large ventilator and skylight placed in the roof immediately over the successive openings thus left in the floors of the different stories: these openings also to be surrounded by a proper railing or high sheathing. It is a well-known fact, that, when fire breaks out in a tenement-house, the stairway is often the first thing destroyed, and, except in the rare instances where iron ladders have been attached outside the house, the tenants are entirely cut off from escape.

So many terrible casualties have occurred from this cause, that the demand is certainly most imperative for some change which shall secure greater safety to the thousands who must

necessarily live in these tenement-houses, and who are themselves powerless to make any provision for their own protection. There are in New York thousands of these houses, many of them models in other respects, where there is absolutely no possibility of escape for the tenants in the upper stories, should a fire break out at night in the lower, and not be speedily extinguished. Many are so much higher than the adjacent buildings, that a fire-escape leading out upon the roof is of no avail, and, as we have already stated, the provision of external iron ladders is very exceptional.

The adoption of outside staircases, as advocated by Mr. Worthen, would thus seem to obviate, so far as can be done by construction, many of the remediable evils attaching to the tenant-house system. It would afford ample light and free ventilation to the halls and rooms. It would greatly diminish the risk of death by fire, and would afford opportunity, by means of the tower, of placing the sinks and other similar appointments outside the body of the house, and thus relieve the latter of one great source of infection. This plan has in its essential features been adopted in several first-class tenements, and is very successful, more so than any other we have seen. In these cases the tower is built directly against the rear of the house, and contains, besides the staircase, the sinks and all those appurtenances of a dwelling-house which are the most prolific sources of disease. Where there are front and rear houses, both may be connected with one tower situated between the two.

In the case of two dark bedrooms opening from one dwelling-room, a window should be cut between the two. In addition to this window, the bedrooms should be ventilated by shafts running to the roof, with a separate flue for each room, as otherwise the foul air from the rooms below would enter those above. This plan is carried out in the best tenements, and is very successful.

To remedy defective drainage, it is only necessary that the plumbing of the house should be on the proper plan, especially with reference to traps, the importance of which is now fully recognized by architects; and where there are no sewers, that the grading of the yards and the surface gutters should be faithfully attended to.

A proper system of construction, however, will of itself be of no avail in tenement-houses, unless accompanied by constant watchfulness. Rooms will be overcrowded; windows and doors will be persistently closed; apertures for ventilation will be stuffed with rags; refuse matters will be thrown into the sinks, clogging the waste-pipes, and destroying the efficiency of the plumbing, however perfect; drains will be broken and obstructed; filth will accumulate in the cellars and halls; periodical scrubbing and whitewashing, a most essential measure, will be neglected; the walls will become foul and saturated with the various exhalations of crowded rooms; and the model tenement-house will soon become as unwholesome as the worst.

Reform in this matter can, in our opinion, be made permanent only by forcing upon the owners of such property the responsibility of its management. Weekly, or, if desirable, more frequent inspections of every tenement-house, from garret to cellar, should be made by the owner or other competent authority, who should exact from each tenant strict compliance with such rules as are necessary to the salubrity of a dwelling; and any tenant who persists in living in a manner detrimental to the health of his neighbors should no longer be allowed to remain. Such a system would soon improve the habits of the tenants; and the certainty of a weekly inspection would at least secure a vigorous cleansing at those times, which of itself would prevent the terrible accumulations of filth which are now a disgrace to so many landlords. A competent house-keeper should also reside on or near the premises, whose duty it should be to keep the halls, sinks, and other portions of the house used in common by the tenants clean and in repair. It is in a great measure due to the neglect of these reasonable precautions that so much labor and expense are entailed upon the public for sanitary measures.

These remarks on the subject of tenement-houses are not theoretical, but express the results of observation of the reforms which have been actually carried out in New York during the last two years.

In addition to this greatest source of peril to the health of the city, the neglected condition of the dwellings of the

laboring classes, there were establishments for slaughtering animals, for the melting of fat, for the various processes for utilizing the different kinds of offal, for the manufacture of fertilizing agents, and the preparation of chemicals, besides numbers of crowded and filthy cow-stables, hog-yards, and other nuisances of minor character, which together presented such an array of evils as made it a matter of considerable difficulty to decide where and how to begin the work of reform.

But far more appalling than the magnitude of the material labor before the Board was the apathy which possessed the minds of those who were the more immediate sufferers from these nuisances, and the sullen, but obstinate, opposition of those to whom they had long been a source of profit.

Accustomed for years to the undisturbed possession of what they considered, or pretended to consider, their rights, this latter class stigmatized as tyranny and usurpation every effort to abate the causes of physical disease and moral degradation; while those in whom long-continued submission had engendered a lethargic content were, in many instances, almost equally ready to join in resistance to any measure which would tend to disturb them in their habitual mode of life.

To herd human beings in buildings and rooms almost devoid of ventilation, and without the commonest provision for cleanliness or even decent privacy, to crowd them into dark, damp cellars, to lodge them in subterranean dormitories where not a ray of sunlight nor a breath of fresh air ever penetrated, and to allow these dwellings from year to year to accumulate filth and infection from this dense mass of humanity without an effort at renovation, was, in very many cases, the alleged inalienable right of a property-holder.

To carry on a business or manufacture, in the midst of a dense population, the processes of which resulted in the corruption of the atmosphere, thus undermining the health and destroying the lives of those whom poverty debarred from escape, was also a practice which long-continued indulgence had transformed into a fancied right.

To use the public streets as common receptacles for refuse and filth of every description, and to leave the foul mass there to putrefy and load the air with its poisonous exhalations, was,

in some parts of the city, a practice so universal and popular, that to prevent it was to take away one of the first privileges of a citizen.

We mention these matters merely to show how comparatively easy it is to discover and appreciate the causes of deterioration in the public health, and theoretically to devise measures for their removal, and yet how difficult, and at times almost discouraging, it is to effectually apply the remedy.

The aim of the Metropolitan Board of Health from the beginning was to do its work with a gentle, though firm hand. It was at once apparent that to be successful it must be cautious, and that very often, although the object to be gained might be distinctly recognized from the first, its accomplishment must be reached by slow approaches, lest by too impetuous an attack a recoil should be the result, and the popular support, upon which the ultimate usefulness of the Board must rest, should be lost.

A people long accustomed to order their lives, each individual in his own way, without reference to those about him, cannot all at once be brought to see the benefit of a measure which shall subordinate personal advantage to the general good.

To any measure of this sort the people must be educated. They must be led by their own observation to believe in it. They must be given time, from step to step, to see in what direction the work is tending, and to discern that each individual will in the end enjoy far greater benefits when all shall so live as to contribute to the public welfare.

True as these observations are, the principle which they set forth is not always appreciated. In the early days of the Metropolitan Board of Health, there were many of its friends who grew very impatient at what they regarded its timidity, and called upon it, now that it had the power, to use it vigorously, and sweep away at once the evils which it was created to remove.

Happily the Board was guided by wiser counsels. It began by inviting conferences, by appealing to the citizens generally, and especially to such as were principally engaged in avocations which were in some of their results objectionable, to meet with

the Board and advise as to the best method of obviating the existing difficulties.

These conferences, although by no means always successful in reconciling the parties interested to the proposed changes, and in preventing the necessity for subsequent coercive measures, were still of great advantage, in showing to the public generally that the Board had no disposition to use its powers in any unnecessarily arbitrary manner, but, on the contrary, were ready to accord the fullest respect to the rights of every citizen, and so to accomplish the reforms which it was its duty to insist upon as to entail the least possible pecuniary loss or other embarrassment to any individual or class.

A notable instance was the conference with the butchers. Private slaughter-houses of every size and description, some two hundred in number, were scattered through the most populous portions of the city, and especially those chiefly occupied by tenement-houses.

The evil influence of these establishments upon the public health was very decided, not only from the filthy and neglected condition of many of them, but from the defilement of the streets through which the cattle had to be driven, and the constant necessity of carting offal and other offensive accumulations through the city, as well as the corruption of the atmosphere from the crowding together of heated and travel-worn animals in small, confined yards and pens. The constant bellowing of the footsore and homesick cattle, the ceaseless moaning and bleating of the calves and sheep, and the squealing and grunting of the pigs, disturbed and indeed often-times entirely destroyed the sleep of the occupants of the surrounding tenements, which were filled with the laboring classes, who could ill afford to be thus robbed of their natural rest. There was no cause for hesitation or delay as to the proper action to be taken regarding these places. The bitter and universal complaints of the throngs of work-people who filled the lofty tenements that overlooked and received the exhalations from these establishments, — their stifling rooms, which were frequently found by the sanitary inspectors with every window closed, especially in hot weather, lest the ingress of noisome odors and swarms of flies should render them untenable, —

the sickly and vicious children, rendered so by the noxious effluvia and the brutalizing exhibitions of the slaughter-pen,—all pointed with a significance which none could reasonably deny to the expulsion of these nuisances from the city. That this should be the ultimate disposal of them was the early determination of the Board ; but as the change would involve serious modifications, on the part of the butchers, in the method of conducting their business, it was deemed best to lay the matter fairly before them, and, if possible, gain their co-operation.

A call was accordingly issued for a meeting of all persons interested in the slaughtering of animals, to consider with the Board the question of the removal of the whole business beyond the city limits. A large concourse of butchers responded to this call.

The views of the Board were laid before them, and a free interchange of opinion was invited. An animated discussion ensued. It was declared by the butchers that the two hundred private slaughter-houses scattered through the city, with their daily and nightly contributions of noxious gases above ground, and of putrid blood and offal to the sewers below, were the necessary and only means for supplying the citizens of New York with meat. In the light of the experience of Paris and London this needed no refutation ; yet the butchers remained determined to hold to the existing plan, if possible. But the very publicity of their avowal, and the display of selfishness in their arguments, proved of great advantage to the Board. Showing as it did to the public that these nuisances, the evil effects of which had long been generally recognized, were by no means necessarily incident to a great city, as the proprietors claimed, there was at once a general indorsement of the proposed action of the Board, and throughout the entire year of injunctions, suits, and vexatious contests which followed, to the final banishment of the business of slaughtering from the populous portions of the city, the commission received the cordial sympathy and encouragement of all classes of the community, save that alone which would be temporarily incommoded by the change.

The erection of ample slaughter-houses upon the outskirts of the city, immediately upon the water, provided with every



facility for cleanliness and decorum, and efficient means for utilizing hides, hoofs, horns, bones, blood, and offal upon the spot, before the commencement of putrefaction, is fast adding the evidence of this city to that of the cities of the Old World, that public *abattoirs*, under public inspection, insure the best meat-supply, and at the cheapest rates.

The experience of the Board was similar with reference to the nuisance arising out of the process by which the illuminating gas was purified at the various manufactories, — a process which resulted in periodically deluging the city, especially in the upper portions, with sulphuretted hydrogen gas. This, too, had been bitterly complained of, but had been regarded as necessarily attaching to this mode of lighting the city. Representatives of the different gas companies were therefore assembled at the chambers of the Board, when, after considerable discussion, it appeared that the continuance of this offensive method of purification was a measure, not of necessity, but simply of economy to the manufacturer. This once clearly demonstrated, the mere pressure of public opinion so strengthened the hands of the Board, that this most grievous nuisance was abated with but little exercise of authority on their part. Here was a business which none could deny was certainly most important to the city, and yet the brilliancy of its results was dimmed, and the enjoyment of its benefits grievously impaired, by the penetrating and disgusting odors which accompanied one of its essential processes. The purification of the crude coal gas was accomplished by passing it through immense chambers filled with lime. This lime absorbed, that is, took up and mechanically held within its substance, the impurities, which consisted chiefly of sulphuretted hydrogen gas, the most offensive of all gases. At certain regular intervals the lime became saturated with the gas, when it was necessary to empty the purifying chambers, and renew the lime. Then came the nuisance. The lime, surcharged with the noxious constituents of the crude gas, as soon as it was removed from the confinement of the close tank, evolved clouds of the noisome sulphuretted hydrogen, which floated over the city, poisoning the atmosphere, and penetrating the houses in spite of the most prompt and careful closing of every window and door.

When the question of abating this nuisance was first agitated, the reply was, that there was no remedy: the city must either be in darkness, or pay this dreadful penalty for light. The alternative, however, was not accepted. The subject was fully investigated, and a satisfactory result soon reached. The process of purification was changed, and the trouble disappeared. It was ascertained, that, by the use of oxide of iron instead of lime, the offensive elements of the crude gas were chemically destroyed, entering into combination with the iron, instead of being merely held mechanically, as with the lime. The requisite substitution was made, and the gas companies still continue to illumine the city, without contributing their former liberal share to the corruption of its atmosphere.

Very many other manufactures are essential to the maintenance of a populous community, which, if conducted in improper situations or without the proper appliances, are most prolific sources of disease. Many such attracted the early notice of the Board, — for example, fat-melting, the utilization of various kinds of offal, and the manufacture of fertilizing agents from refuse bones and other material.

The deleterious effect of these processes upon the public health was frequently and strenuously denied, on the ground that the employees in the manufactures were healthy, that no specific disease in the neighborhood could be traced to emanations from the establishments, and sometimes even that chemistry itself failed to detect in the fumes any substance directly injurious to any organ or function of the human body. A little reflection will show the sophistry of these arguments. The fact that men and women may by long and constant habit become inured to the presence of offensive gases is no proof that they are innocuous to those who are unaccustomed to them. Nor is it necessary that any specific disease shall result to prove their deleterious character. That they lower the general tone of the system, disturb digestion, and impair the healthful and pleasurable exercise of all the functions of the body, is, even more than the production of a definite and recognizable form of disease, a reason for condemning and prohibiting their continuance. This radical course, however, is frequently found to be unnecessary. The advance of science, and

improvements in apparatus, have rendered it possible to conduct almost any process, however offensive and unwholesome the gases resulting therefrom may be, in such a manner as to cause no pollution of the surrounding atmosphere. Thus it is with the business of fat-melting, which two years since was carried on in New York very extensively in large open kettles, the foul steam from which, loaded with organic matter frequently in a putrid condition, escaped in dense volumes into the streets, and was borne by the wind over wide and populous districts, compelling the inhabitants to close every window and door, and endure the confined and heated air of their own apartments, rather than the intolerable stench from the outside. When the nuisance was attacked by the Board, the reply was, that these odors were the unavoidable results of a business essential to the life of the city, and must be submitted to; and it was only after a long and hot contest in the courts that the Board was finally sustained in its order that no fat-melting should be permitted at any factory until the apparatus employed should be so modified as to prevent the escape of any offensive odors into the external air. This prohibition at once caused a change in the whole business; and the prompt substitution of the steam tank for the open kettle completely abated one of the foulest nuisances with which the city was afflicted, and that not only without really damaging the interests of the fat-melters, but, on the contrary, permanently benefiting them. This business is carried on to-day as extensively as it was two years ago; but now the offensive vapor, instead of rising from the large open caldrons, and escaping unhindered into the air, is conducted from the tight tank in which it is generated, through a pipe, into a condenser, whence, in a liquid form, it passes beneath the factory and is discharged into the street sewer.

Such was the course pursued, not only with reference to nuisances of this general character, but also in dealing with those of more limited influence. No individual has ever been compelled to change the mode of conducting his business, or alter the condition of his premises, without an opportunity being first offered him of personally appearing before the Board or some responsible officer of it, and showing cause why an order

on the subject should be modified or rescinded. In very many instances the execution of an order has been stayed, on the representation by the party upon whom it was served that its delay or modification would enable him to protect himself from undue damage without causing the public to suffer in consequence.

This deference to the rights of every citizen, combined with a firm enforcement of its regulations, has been the stronghold of the Commission. At first the visits of the sanitary inspectors were looked upon with distrust and suspicion; but as it became evident that their investigations and reports were made with strict regard to private rights, and in a spirit of justice, with no partisan ends in view, or reference to anything but the true merits of the case, the manner of their reception changed, and later, as the results of their visits began to appear in the relief of suffering, and the removal of sources of discomfort and disease, the change was still more marked. While in the early days of their work information was given to these officers most grudgingly, and the materials for their reports were obtained only after the most disagreeable and sometimes dangerous experiences, now they are welcomed, and treated with all respect and courtesy.

Undoubtedly, during the first year of the existence of this department of the metropolitan government, the presence of cholera, with the vague dread which it inspired, had a powerful influence in recommending the measures adopted by the Board. When it became evident that the pestilence had actually reached the country, and was searching out the places where congenial surroundings should add to its power and promote its development, the efforts of the Board to anticipate its progress, and destroy everything that could nourish its strength, were warmly seconded, and an occasional summary exercise of authority was applauded; and it was in this emergency only that peremptory orders were issued and promptly executed.

The course of the epidemic corroborated the evidence which the history of previous ones had invariably afforded, namely, that tenement-houses offered by far the most favorable fields for the development and spread of the disease. The first victim was an occupant of one in a conspicuously insalubrious

condition, and its immediate evacuation by order of the Board, and its prompt cleansing and disinfection, were followed by entire immunity throughout the season, although the occupants were allowed to return after a few days. This action, arbitrary and usurping as it might seem, was cheerfully acquiesced in by the owner of the property, and the expenses attending it were defrayed without complaint. During the prevalence of the epidemic, each new case was treated in a similar manner, and even all the houses in the vicinity of the one infected were subjected to precautionary measures without giving rise in any instance to serious complaint.

In all cases disinfectants were promptly and freely used, though necessarily at first in a somewhat experimental manner, owing to a lack of accurate knowledge as to the peculiar power of disinfectants, the exact quantity required, the time for which it was necessary to subject articles to their action, and other practical details. It was therefore frequently thought best to burn soiled articles, especially beds, lest the disinfection should be slow or imperfect.

A great variety of manufactured and patent disinfectants were brought before the Board or the superintendent. Many of these were of but little value, while those which were thought worthy of a trial were invariably found to depend for their efficacy upon the preponderance in them of some one or more of the well-known and long-tried disinfectants. A large quantity of chloride of lime, carbolic acid, sulphate of iron, and permanganate of potassa was therefore purchased,—all of them articles which abundant experience in hospitals civil and military, and in private practice, had proved to be most effectual for ordinary disinfection, and the recent use of which abroad had given evidence of a probable efficacy in arresting the progress of cholera. Measures were at once adopted for the constant use of these agents, and a plan was put in force by which every case of cholera that could be discovered should be promptly investigated, the patient cared for, and every possible advantage derived from disinfection. All persons were called upon to give intelligence at once, at the nearest police precinct station, of any case of supposed cholera coming under their notice. The officer in charge of the station-house was to

notify the nearest sanitary inspector, and it became the duty of the latter immediately to investigate the case, report its true character by telegraph to the central office, and render such professional aid, and, in cases proving to be cholera, direct such measures for preventing the spread of the disease, as might be necessary. The office of the superintendent was constantly open, and four inspectors were detailed for extra duty at night and on Sunday, two of them being at the office on alternate nights and Sundays. It was the duty of these officers to attend to any cases which might become known to them directly, or which might be referred to them from a precinct station-house, when the officer in charge there had failed to find an inspector close at hand. It was also their duty to send disinfectants, when necessary.

Under the direction of the Board, a disinfecting depot and laboratory were established in a building adjacent to the central office. The depot was placed under the immediate charge of a competent druggist. Several assistants were employed; and a sufficient number of horses and light covered wagons were purchased, and kept in a neighboring stable, ready for use at any moment.

The laboratory was in constant operation for experiments in the use and combination of various disinfectants, and the men were instructed in their proper and faithful application. The officer in charge and his men lodged in the building; and the latter were organized into various squads or reliefs, for duty in successive portions of the twenty-four hours. This duty, as the season advanced, became very laborious, and often hazardous.

The men were constantly visiting infected districts, entering the houses, and handling the bedding and clothes of cholera patients; they were obliged to disinfect all bodies of those who had died of cholera, and frequently to place them in coffins and remove them to the morgue. The process of disinfection consisted in putting sulphate of iron, either in saturated solution, or dry, if used in wet places, wherever infectious matter had been deposited. All bedding and clothing soiled or used by the patient was boiled for two hours in a solution of permanganate of potassa, of the

strength of one ounce to five gallons of water, and then taken out and re-boiled in pure water. For purifying the atmosphere of the room without incommoding the patient, chlorine was gradually set free by adding sulphuric acid to a mixture of binoxide of manganese and chloride of sodium (common salt). In addition to these measures, chloride of lime or Labarraque's solution of chlorinated soda was scattered freely over the floors of the rooms and halls of the house. Dead bodies were washed in a solution of chloride of lime or chlorinated soda, and then packed in the coffins with chloride of lime.

A large quantity of common lime and charcoal-dust was purchased, and used in the general disinfection of filthy localities, without reference to the occurrence of cholera. A number of horses and carts were hired, with a sufficient number of men to furnish each cart with one helper besides the driver, to distribute this material. The plan adopted was to pass through each street in the filthy parts of the city once a week, and in some instances twice, and sprinkle the disinfectants freely along the gutters and through the alleys and yards, and deposit a certain amount in each garbage-box and foul cellar. Now and then a few cart-loads of sulphate of iron and chloride of lime were used in the worst places. At first the inhabitants misunderstood the proceeding, but it soon became popular and received their hearty co-operation.

Additional instructions were issued to the sanitary inspectors "to immediately investigate any case of supposed cholera reported to them at any hour by any officer of the Metropolitan Police, to do what might be immediately necessary professionally, and give instructions as to the proper method of obtaining medical attendance from the dispensaries, or, if the case required it, of gaining admission to hospital, and to furnish the necessary certificate." They were at once to decide what was requisite in the way of disinfection; and if the parties were able to procure and employ the necessary articles themselves, to give them detailed instructions regarding the same, and make a reinspection of the premises six hours later to ascertain if their instructions had been carried out. In any case where the parties were unable to procure and employ the necessary articles,

the inspector was to apply at the nearest police station, and, through the officer in charge, telegraph to the office of the superintendent that disinfection was required at such premises, giving the street, number, and room accurately. It was his duty then to reinspect after six hours and ascertain whether the proper measures had been taken, and to report his action at the office of the superintendent, in person, by telegraph, or in writing.

The sanitary inspectors kept watch of every case of cholera investigated by them until either recovery or death took place, and then promptly reported the result to the superintendent,—in writing, if recovery, by telegraph, if death. The inspectors in the country districts were instructed to “forward to the office of the superintendent a written report upon each case of supposed cholera investigated by them, whether proved to be genuine or not, within twenty-four hours subsequent to said investigation.” The inspectors also made thorough examination of premises where any cases of cholera occurred, and visited every family residing on or near such premises, inquiring carefully for any premonitory symptoms resembling those of cholera, and, on finding such, giving advice, and, if necessary, treatment. This investigation extended through the whole block, and as much farther as the situation and circumstances required. These visits were repeated from time to time during the week or two following the occurrence of any case, so as either to make sure that no second case was to appear, or, in the event of such appearance, to meet it promptly.

The practical application of disinfectants was soon reduced to a simple system, which was followed in every case, and with apparently satisfactory results. Whenever a despatch was received at the central office that disinfection was needed at any house, men of the disinfectant corps, with a wagon loaded with the requisite material, were at once sent to the spot. The officers and men of the police force were prompt in their co-operation, and the disinfecting men were usually at their work on the premises within an hour from the time at which the despatch was forwarded from the station-house.

The plan of disinfection thus described gave entire satisfac-



tion as regards clothing and other immediate surroundings of the patient ; but frequently the recurrence of successive cases in tenement-houses showed that the power of such measures was too limited, and at an early date general fumigation of such buildings was resorted to, either with chlorine or sulphurous-acid gas. The process was this. All tenants were removed from the house, being allowed to take out nothing more than the clothing then upon them. All the windows and chimneys were closed. The gas was then set free in quantity,—if chlorine, by the addition of sulphuric acid to chloride of lime,—if sulphurous acid, by the burning of sulphur in large open pans supported by long iron legs. The men employed commenced the process on the upper floors, and descended, leaving the pans in operation on the different floors, and finally closed the street-door. The house thus filled with the gas was left undisturbed from eight to twelve hours. It was then opened and freely aired, and finally the tenants were allowed to reoccupy.

After the subsidence of cholera, the plan of disinfection and cleansing was continued, though with less magnitude of apparatus, and applied to houses where the existence of fever of an infectious character was discovered, or the condition of which was found to be such as to impair the health of the occupants.

The practice thus instituted and submitted to under the fear of contagion became, by an easy transition, a permanent custom. The tenement-houses, as well as other premises likely to be detrimental to the public health, remained constantly under the strict supervision of the Board, and subject to its authority, until, at the assembling of the Legislature in 1867, new and more extensive powers were given to the Board, and a tenement-house law was passed, which it is hoped will establish on a permanent basis improvements which might otherwise be but temporary.

The control of small-pox by periodical inspections of all public schools and other educational institutions, and the vaccination of the inmates, we need not dwell upon, and will only mention in passing.

There is still great necessity for the regulation of occupations injurious to health, such as those followed by needle-women, tailors, bakers, printers, etc., whose work-rooms are generally

crowded and ill-ventilated, and whose modes of life, induced by the conditions under which they earn their livelihood, are in a high degree conducive to disease, especially consumption.

In several of the suits that the Board has been engaged in, having reference to the abatement of nuisances consisting of offensive odors, the question has been mooted as to what particular odors are and what are not detrimental to health. We are convinced that the only consistent and philosophical position on this question is, that all odors are detrimental to health, — that is, that unadulterated atmospheric air is best adapted to preserve all the organs in a perfectly healthful condition, and that anything which impairs the absolute purity of the atmosphere must of necessity be deleterious.

When, however, we consider the conditions under which a great city exists, the multitudinous necessities which attach to its traffic and its growth, we cannot expect that the atmosphere which pervades it shall be absolutely pure; still, we must not lose sight of the principle that the odors which attend on the various life of the city are so many warnings of danger, and that it is incumbent upon us to watch jealously these warnings, and see to it that they do not reach an intensity beyond that demanded by actual necessity.

The vast multitudes that throng the avenues of a metropolis, whose thoroughfares are bounded on either side by lofty warehouses or dwellings, whose streets are tunnelled with sewers, the contents of which, made up of all the various *débris* of the growth and decay of the community, are poured into the rivers that wash its shores, whose buildings are illumined with gas, the manufacture of which must be carried on either within or close upon the city precincts, whose wharves are crowded with vessels from every foreign port, and whose population is made up in great measure of the surplus of every country of the Old World, cannot expect to breathe the bracing air of the mountains or the sea-shore. But they can expect, and should demand, that the impurities be reduced to the minimum that unavoidably attaches to the prosperity and progress of the city. To reach this point is the aim of the Metropolitan Board of Health.

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